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POWDERED FAT COMPOSITION AND PROCESS

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This invention relates to a powdered free flowing fat composition and to a process for preparing the same. This application is a continuation-in-part of U.S. application S.N. 517,646, filed June 23, 1955, for Food Product and Process.

Powdered fat compositions consisting generally of small particles of fat incased in a coating of edible, water soluble solids, and their use in various food products such as cakes, pastries, bread, toppings, and the like, are well known. It has been proposed, for example, to dry emulsions of shortening fat and non-fat milk solids either by spray drying, drum drying, or the like, to provide a powdered free flowing shortening composition. Such proteinaceous materials as buttermilk solids, whey solids, whole eggs, egg yolks, gelatin, sodium caseinate, and neutral water soluble soy protein have been proposed as encapsulating solids; the use of other materials, either separately or in combination with some of the aforesaid proteinaceous materials, including gums such as cellulose ethers, gum tragacanth, gum acacia and carbohydrates such as starches and sugars has also been proposed. Furthermore, improved powdered fat products have been prepared employing "emulsifiers" such as lecithin, partial esters of glycerin and the higher fatty acids, and partial ester; of sorbitol and the higher fatty acids.

These powdered fat compositions offer the advantages of ease of handling and of incorporation with other dry free flowing ingredients during the preparation of various food products. They have enjoyed a fair amount of commercial success. Thus they have been used as part of the shortening in donut, cake and biscuit mixes where it is desired to have a free flowing product, but in all of these applications there is usually also employed a plastic shortening due to the inability of the powdered fat to act by itself to supply the fat needed.

For example, a large potential use of powdered fat compositions is in prepared cake mixes. The present mode of incorporating shortenings into these mixes roughly parallels that of the housewife and involves the step of creaming the shortening with one or more of the dry ingredients such as sugar or flour. This creaming step is necessary to insure an adequate distribution of the shortening throughout a cake batter prepared from such a mix. It is obvious that the use of powdered shortenings would provide a great advantage to a cake mix manufacturer by eliminating the costly and time consuming creaming operation. A powdered shortening would also be preferred over conventional modes of incorporating plastic and like shortenings in dry mixes for bakery products because it affords the opportunity to emulsify the fat phase in a matrix of water soluble materials with the possibility of lessening the effort required for proper dispersion of the

fat in the batter and controlling the manner in which the fat becomes available for effective cooperation with the farinaceous ingredients, the sugar and the leavening agent in a mix as it is hydrated to a batter. However, the presently available powdered shortenings, even when they contain so-called superglycerinated fats, produce cakes extremely poor in volume and rubbery in texture; the reason generally given for this poor quality is the manner in which the fat phase of the powdered shortening is released to be effective in cake baking. Either the fat is released too slowly and hence is not effectively utilized or else the fat is released from its matrix in such a way as not to be properly dispersed throughout the batter during its preparation. For this reason, attempts have been made to modify the manner in which the shortening fat is released from the powdered fat compositions on contact with aqueous liquids by the use of hydrophilic colloids. However, none of these attempts has been adequate due to the inability of the fat phase released to form the proper emulsion in the batter.

Powdered fat compositions for use in preparing whipped toppings are also known. These materials offer the advantage of ease of handling due to their free flowing character and freedom from spoilage on storage for long periods of time due primarily to their low moisture content. However, because these products generally do not have the texture and appearance of natural whipped cream, when reconstituted and whipped in aqueous liquids, they have not enjoyed much commercial success. More important, however, these materials usually perform in an inconsistent manner providing in many cases little or no overrun on whipping. For example, a paste emulsion of skim milk solids, fat, sucrose, and a mixture of mono- and di-glycerides, while readily whipped when added to whole milk, has been found to be virtually unusable when it is dried. In the dried form an excessive whipping period is required even when a mechanical beater is employed. The problem of whippability is particularly difficult in the case of a dried emulsion which is to be reconstituted and whipped in whole milk, apparently because the fat of whole milk interferes with the whippability of the product from the standpoint of overrun and extent of whipping required. Some improvements in whippability apparently can be obtained by substituting a water soluble protein such as sodium caseinate for the milk solids, but the overrun is usually low, the texture heavy and pasty, and the after-taste or mouth-feel greasy.

It appears that in food emulsions of high fat content wherein air is incorporated into the emulsion that the eventual product comprises a series of bubbles of air or cells which are embraced by an aqueous phase which should be substantially elastic. Surrounding these cells are globules of fat. The elasticity of the cell wall of the aqueous phase is provided by the proteinaceous material present together with other dissolved solids. The fat globules and this aqueous phase should be sufficiently stable so as to prevent the emulsion from breaking as evidenced by either weeping of the aqueous phase or churning i.e., the excessive coalescence of quantities of fat which with continued whipping results in the complete separation of the fatty constituents from the aqueous phase. At the same time the foam system of the aqueous phase should be capable of incorporating sufficient air in the presence of the fat globules so that a high degree of overrun is obtained in a short whipping interval after the